REMARKS

Claims 1 through 7, 10, and 16 have been canceled. Claims 8 and 9 have been previously canceled. Claims 11 through 15 and 17 through 19 have been amended. Claims 11 through 15 and 17 through 20 remain in the application.

Claims 1 through 7 and 11 through 18 were rejected under 35 U.S.C. § 103 as being unpatentable over Gimby (U.S. Patent No. 4,938,254) in view of Feinberg (U.S. Patent No. 3,234,959). Claims 1 through 7, 10, and 16 have been canceled and the rejection as to these claims is now moot. Applicant respectfully traverses this rejection as it applies to claims 11 through 15, 17, and 18.

U.S. Patent No. 4,938,254 to Gimby discloses an over-pressure relief valve. A fuel valve 10 has a valve member 12 which is positioned within the opening O and which is reciprocable within the opening O along the central axis of the opening O. The valve member 12 has a first end 14, which is positioned adjacent to an outside face of the vessel V, and a second end 16, which is positioned within the vessel V. The valve member 12 has a part toroidal recess 18 positioned adjacent to the first end thereof, and the valve member 12 carries an elastomeric O-ring 20 which is retained in the recess 18. Gimby does not disclose a fuel pump having a valve member with a single outlet port disposed below a groove thereof and located axially between a valve seat and one end of a valve housing when the valve member is in a closed position to prevent fuel flow and to allow fuel flow when the valve member is in an open position.

U.S. Patent No. 3,234,959 to Feinberg discloses a checking valve device. A valve has a casing 10 and a pair of tubular coupling members 14,15 screwed into access openings 12,13 of the casing 10. A pair of tubular sleeve members 28,29 is positioned within the casing 10 before the coupling members 14,15 are screwed in place. A pair of fluid discharge orifices 35,36

is formed in the side walls of the sleeve members 28,29 upwardly from the closed ends of those members to provide separate fluid passages through the valve. Feinberg does not disclose a fuel pump including a valve housing disposed in an outlet member, a valve seat formed on an interior surface of the valve housing, a valve member disposed in the valve housing and having an end adjacent the valve seat with an annular groove having a generally circular cross-sectional shape extending radially into the end, and a seal disposed in the groove for contacting the valve seat. Feinberg also does not disclose a fuel pump including a spring disposed about the valve member and located axially between the valve seat and one end of the valve housing to urge the valve member toward the valve seat. Feinberg further does not disclose a fuel pump including a valve member with a single outlet port disposed below a groove thereof and located axially between a valve seat and one end of a valve housing when the valve member is in a closed position to prevent fuel flow and to allow fuel flow when the valve member is in an open position.

In contradistinction, claim 11, as amended, clarifies the invention claimed as a fuel pump including an outlet member having a first passageway therethrough and a valve housing disposed in the first passageway of the outlet member. The fuel pump also includes a valve seat formed on an interior surface of the valve housing and a valve member disposed in the valve housing and having an end adjacent the valve seat with an annular groove having a generally circular cross-sectional shape extending radially into the end and including a seal disposed in the groove. The valve member has a closed position in which the seal engages the valve seat to prevent fuel from flowing through the outlet member and an open position to allow fuel to flow through the outlet member. The fuel pump further includes a spring disposed about the valve member and located axially between the valve seat and one end of the valve housing to urge the valve member toward the valve seat. The valve member has a single outlet port

disposed below the groove and located axially between the valve seat and the one end of the valve housing when the valve member is in the closed position to prevent fuel flow and to allow fuel flow when the valve member is in the open position.

The United States Court of Appeals for the Federal Circuit (CAFC) has stated in determining the propriety of a rejection under 35 U.S.C. § 103, it is well settled that the obviousness of an invention cannot be established by combining the teachings of the prior art absent some teaching, suggestion or incentive supporting the combination. See In re Fine, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 227 U.S.P.Q. 657 (Fed. Cir. 1985); ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 221 U.S.P.Q. 929 (Fed. Cir. 1984). The law followed by our court of review and the Board of Patent Appeals and Interferences is that "[a] prima facie case of obviousness is established when the teachings from the prior art itself would appear to have suggested the claimed subject matter to a person of ordinary skill in the art." In re Rinehart, 531 F.2d 1048, 1051, 189 U.S.P.Q. 143, 147 (C.C.P.A. 1976). See also In re Lalu, 747 F.2d 703, 705, 223 U.S.P.Q. 1257, 1258 (Fed. Cir. 1984) ("In determining whether a case of prima facie obviousness exists, it is necessary to ascertain whether the prior art teachings would appear to be sufficient to one of ordinary skill in the art to suggest making the claimed substitution or other modification.")

None of the references cited, either alone or in combination, teaches or suggests the claimed invention of claims 11 through 15, 17, and 18. Specifically, Gimby '254 merely discloses an over-pressure relief valve in which a valve member is reciprocable within an opening and has a first end with a part toroidal recess and an elastomeric O-ring retained in the recess. Gimby '254 lacks a fuel pump having a valve member with a single outlet port disposed

below a groove thereof and located axially between a valve seat and the one end of a valve housing when the valve member is in a closed position to prevent fuel flow and to allow fuel flow when the valve member is in an open position. In Gimby '245, there is a pair of radial openings 28 and 30 in the valve member 12.

Feinberg '959 merely discloses a valve checking device having a casing, a pair of tubular coupling members, a pair of tubular sleeve members positioned within the casing before the coupling members are screwed in place, and a pair of fluid discharge orifices formed in the side walls of the sleeve members. Feinberg '959 lacks a fuel pump including a valve housing disposed in an outlet member, a valve seat formed on an interior surface of the valve housing, a valve member disposed in the valve housing and having an end adjacent the valve seat with an annular groove having a generally circular cross-sectional shape extending radially into the end, and a seal disposed in the groove for contacting the valve seat. Feinberg '959 also lacks a fuel pump including a spring disposed about the valve member and located axially between the valve seat and one end of the valve housing to urge the valve member toward the valve seat. Feinberg '959 further lacks a fuel pump including a valve member with a single outlet port disposed below a groove thereof and located axially between a valve seat and one end of a valve housing when the valve member is in a closed position to prevent fuel flow and to allow fuel flow when the valve member is in an open position.

As disclosed in the Background of the Invention section of the present application, eddy currents tend to create a low pressure on one side of a pintel of a check valve having two outlet ports being opposed or 180 degrees apart. This low-pressure area causes the pintel to tip toward this low pressure. Once the pintel moves toward the low-pressure area, the low-pressure area alternates to the opposite side of the pintel. This causes the pintel to immediately move back

one hundred eighty degrees (180°) from its original direction of travel. As a result, the pintel is constantly trying to reach positional equilibrium, causing the pintel to oscillate and produce objectionable noise. This unique problem was solved by Applicant by providing a valve member with a single outlet port disposed below a groove thereof and located axially between a valve seat and the one end of a valve housing when the valve member is in a closed position to prevent fuel flow and to allow fuel flow when the valve member is in an open position.

Feinberg '959 had the unique problem of oscillations caused by the sleeve members 28,29 opening and closing. Feinberg '959 solved this problem by providing a pair of springs 33, 34 disposed axially on the opposite side of the valve seat of the sleeve members 28,29 from the discharge orifices 35,36 to reduce or prevent the oscillations. Feinberg '959 does not address the problem of side loads caused by eddy currents and the discharge orifices 35,36 do not stop oscillations. Further, Gimby '245 does not address the problem of side loads caused by eddy currents. Since Applicant had a unique problem that required a unique solution, there is no suggestion or motivation in the art for combining Gimby '245 and Feinberg '959 together.

Even if these references could be combined, neither teaches a fuel pump having a valve member with a single outlet port disposed below a groove thereof and located axially between a valve seat and the one end of a valve housing when the valve member is in a closed position to prevent fuel flow and to allow fuel flow when the valve member is in an open position. Applicant is not attacking the references individually, but is clearly pointing out that each reference is deficient and, if combined (although Applicant maintains that they are not combinable), the combination is deficient. The present invention sets forth a unique and non-obvious combination of a fuel pump including a check valve having a mono-port on the pintel, which reduces oscillations and objectionable noise. The references, if combinable, fail to teach

or suggest the combination of a fuel pump including an outlet member having a first passageway therethrough, a valve housing disposed in the first passageway of the outlet member, a valve seat formed on an interior surface of the valve housing, a valve member disposed in the valve housing and having an end adjacent the valve seat with an annular groove, a spring disposed about the valve member and located axially between the valve seat and one end of the valve housing to urge the valve member toward the valve seat, the valve member having a single outlet port disposed below the groove and located axially between the valve seat and the one end of the valve housing when the valve member is in the closed position to prevent fuel flow and to allow fuel flow when the valve member is in the open position as claimed by Applicants. Thus, the Examiner has failed to establish a case of prima facie obviousness. Therefore, it is respectfully submitted that claims 11 through 15, 17, and 18 are allowable over the rejection under 35 U.S.C. § 103.

Claims 19 and 20 were rejected under 35 U.S.C. § 103 as being unpatentable over Gimby '245 in view of Feinberg '959 and further in view of Hoover (U.S. Patent No. 4,964,391). Applicant respectfully traverses this rejection.

U.S. Patent No. 4,964,391 to Hoover discloses a check valve for engine fuel delivery systems. A fuel delivery system 20 includes a fuel pump 22 for delivering fuel under pressure from a supply or tank 24 to a fuel consumer 26, such as an internal combustion engine. A check valve 28 is connected in a fuel line between the fuel pump 22 and the engine for permitting free flow of fuel from the pump to the engine, but preventing back-flow of fuel from the engine to the pump when the pump is shut off. Hoover does not disclose a fuel pump including a pump section at one axial end, a motor section adjacent the pump section, an outlet section adjacent the motor section at the other axial end, the outlet section including an outlet

member having a passageway therethrough, and a valve housing disposed in the passageway of the outlet member.

In contradistinction, claim 19, as amended, clarifies the invention claimed as a fuel pump including a pump section at one axial end, a motor section adjacent the pump section, and an outlet section adjacent the motor section at the other axial end. The outlet section includes an outlet member having a passageway therethrough, a valve housing disposed in the passageway of the outlet member, and a valve seat formed on an interior surface of the valve housing. The fuel pump also includes a valve member disposed in the valve housing and having an end adjacent the valve seat with an annular groove having a generally circular cross-sectional shape extending radially into the end and including a seal disposed in the groove. The valve member has a flow port extending axially from an inlet into one end thereof. The fuel pump includes a spring disposed about the valve member and located between the inlet and the valve seat to urge the valve member toward the valve seat in a closed position in which the seal engages the valve seat to prevent fuel from flowing through the outlet member. The valve member has a single outlet port extending diametrically therethrough and communicating with the flow port and located axially between the valve seat and one end of the valve housing when the valve member is in the closed position to prevent fuel flow and to allow fuel flow from the outlet port when the valve member is in an open position to allow fuel to flow through the outlet member.

None of the references cited, either alone or in combination, teaches or suggests the claimed invention of claim 19. Specifically, Gimby '254 merely discloses an over-pressure relief valve in which a valve member is reciprocable within an opening and has a first end with a part toroidal recess and an elastomeric O-ring retained in the recess. Gimby '254 lacks a fuel

pump having a valve member with a single outlet port extending diametrically therethrough and communicating with the flow port and located axially between the valve seat and one end of the valve housing when the valve member is in the closed position to prevent fuel flow and to allow fuel flow from the outlet port when the valve member is in an open position to allow fuel to flow through the outlet member. In Gimby '245, there is a pair of radial openings 28 and 30 in the valve member 12.

Feinberg '959 merely discloses a valve checking device having a casing, a pair of tubular coupling members, a pair of tubular sleeve members positioned within the casing before the coupling members are screwed in place, and a pair of fluid discharge orifices formed in the side walls of the sleeve members. Feinberg '959 lacks a fuel pump including a valve housing disposed in an outlet member, a valve seat formed on an interior surface of the valve housing, a valve member disposed in the valve housing and having an end adjacent the valve seat with an annular groove having a generally circular cross-sectional shape extending radially into the end, and a seal disposed in the groove for contacting the valve seat. Feinberg '959 also lacks a fuel pump including a spring disposed about the valve member and located axially between the valve seat and one end of the valve housing to urge the valve member toward the valve seat. Feinberg '959 further lacks a fuel pump including a valve member with a single outlet port extending diametrically therethrough and communicating with the flow port and located axially between the valve seat and one end of the valve housing when the valve member is in the closed position to prevent fuel flow and to allow fuel flow from the outlet port when the valve member is in an open position to allow fuel to flow through the outlet member. In Feinberg '959, a pair of springs 33, 34 are disposed axially on the opposite side of the valve seat of the sleeve members 28,29

from the discharge orifices 35,36 to reduce or prevent the oscillations and the discharge orifices 35,36 do not stop oscillations.

Hoover '391 merely discloses a check valve for engine fuel delivery systems in which a check valve is connected in a fuel line between a fuel pump and an engine. Hoover '391 lacks a fuel pump including a pump section at one axial end, a motor section adjacent the pump section, an outlet section adjacent the motor section at the other axial end, the outlet section including an outlet member having a passageway therethrough, and a valve housing disposed in the passageway of the outlet member. In Hoover '391, a check valve 28 is connected in the fuel line between the fuel pump 22 and the engine 26 and not in the outlet member of the fuel pump 22. As such, there is no suggestion or motivation in the art for combining Gimby '245, Feinberg '959, and Hoover '391 together.

The present invention sets forth a unique and non-obvious combination of a fuel pump including a check valve having a mono-port on the pintel, which reduces oscillations and objectionable noise. The references, if combinable, fail to teach or suggest the combination of a fuel pump including a pump section at one axial end, a motor section adjacent the pump section, an outlet section adjacent the motor section at the other axial end, the outlet section including an outlet member having a passageway therethrough, a valve housing disposed in the passageway of the outlet member, a valve seat formed on an interior surface of the valve housing, a valve member disposed in the valve housing having a flow port extending axially from an inlet into one end thereof, a spring disposed about the valve member and located between the inlet and the valve seat to urge the valve member toward the valve seat in a closed position, the valve member having a single outlet port extending diametrically therethrough and communicating with the flow port and located axially between the valve seat and one end of the valve housing when the

valve member is in the closed position to prevent fuel flow and to allow fuel flow from the outlet port when the valve member is in an open position to allow fuel to flow through the outlet member as claimed by Applicants.

Further, the CAFC has held that "[t]he mere fact that prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification". In re Gordon, 733 F.2d 900, 902, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984). The Examiner has failed to show how the prior art suggested the desirability of modification to achieve Applicant's invention. Thus, the Examiner has failed to establish a case of prima facie obviousness. Therefore, it is respectfully submitted that claim 19 and the claims dependent therefrom are allowable over the rejection under 35 U.S.C. § 103.

Obviousness under § 103 is a legal conclusion based on factual evidence (In re Fine, 837 F.2d 1071, 1073, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988), and the subjective opinion of the Examiner as to what is or is not obvious, without evidence in support thereof, does not suffice. Since the Examiner has not provided a sufficient factual basis, which is supportive of his/her position (see In re Warner, 379 F.2d 1011, 1017, 154 U.S.P.Q. 173, 178 (C.C.P.A. 1967), cert. denied, 389 U.S. 1057 (1968)), the rejections of claims 1 through 7 and 10 through 20 is improper. Therefore, it is respectfully submitted that claims 11 through 15 and 17 through 20 are allowable over the rejections under 35 U.S.C. § 103.

Based on the above, it is respectfully submitted that the claims are in a condition for allowance, which allowance is solicited.

Respectfully submitted,

By: _____

Daniel H. Bliss
Reg. No. 32,398

Delphi Technologies, Inc.
Legal Staff – Intellectual Property
P.O. Box 5052
Troy, Michigan 48007
(248) 813-1214

Date: September 29, 2004

Attorney Docket No.: DP-306071